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EDITOR

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J. J. Lunell
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REPRINT NO. 5.

Observationum Generum Violae, Utriculariae, Gratiolaeque Reimpressio
(1917) mense Julio.

Introduction and Notes. I-XII.—*J. A. Nieuwland*.

Biography and Bibliography. 1-4.—*John Henry Barnhart*.

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NO. I.

ENUMERANTUR PLANTAE DAKOTAE SEPTEN- TRIONALIS VASCULARES.—X.

ENUMERAVIT J. LUNELL.

The Vascular Plants of North Dakota.—X.

With Notes by J. Lunell.

884. *Physostegia parviflora* Nutt.; Benth. in DC. Prodr. 12:
434. (1848).

Leeds.

TETRAITH Dillen. Gen., pone Catal. pl Giss. 103. (1719);
Moench, Meth. 394. (1794).

Galeopsis Fuchs. Hist. 108. (1546) = *Scrophularia nodosa*.
It is an impossible name, used for a number of different plants,
and being etymologically absurd.

885. *Tetraith purpurascens* Gilib. Exerc. Phytolog. 94. (1792).
Towner County: Perth (O. A. Stevens).

CARDIACA Fuchs. Hist. 223. (1546) = *Leonurus Cardiaca*.
Linn. has this name in Syst. (1735), as also Tour., antedating *L.
Cardiaca*.

Leonurus Breynius (1678); Linn. Cuba has the form *Cordiata*,
Hort. Sanit. 106. (1485).

886. *Cardiaca Stachys* Medic. Brobook 126. (1783).

Cardiaca vulgaris Moench, Meth. 401. (1794).

Leonurus Cardiaca Linn. Sp. Pl. 584. (1753).

Wahpeton (Bergman); Kulm (Brenckle).

STACHYS Diosc. 1. 3. c. 110, acc. to Sibthorp. (1813), Graec.
pr. n. 1363 = *St. palestina* Linn. Sp. Pl. ed. II, 1674 (1763).

887. *Stachys scopulorum* Greene, Pittonia 3: 342. (1898).
Leeds, Turtle Mountains.

MONARDA Linn. Gen. Pl. (1737) p. 6. Hort. Cliff. (1737).
p. 11. "Nomen obtinuit planta haec capite crasso a monardo

utroque quorum alter in perquirendo quidquid salutare ex novo orbe proferunt plantae, quidquid sub Rosis et Citris obtulit natura; alter vero perquirendo veterum scripta orbi satisfacere studuit." —Hort. Cliff. p. 12.

888. **Monarda menthaefolia** Graham, Edinburgh, Phil. Journ. 347. (1829).

A profusely branching woodland plant. Turtle Mountains.

889. **Monarda menthaefolia** var. *praerea* Lunell, var. nov.

Caulis non ramosus. Stem not branched.

This plant grows on the prairie. Omemee, Thorne.

HEDEOMA Pers. Syn. 2: 131. (1807).

890. **Hedeoma hispida** Pursh. Fl. Am. Sept. 414. (1814).

Hedeoma hirta Nutt. Gen. I: 16. (118).

Leeds, Minot; Kulm (Brenckle).

891. **Hedeoma Drummondii** Benth. Lab. Gen. & Sp. 368. (1834).

Medora (Bergman).

PHYTOSALPINX Lunell, nom. nov. (Gr. φυτόν a plant, σαλπίγξ a bugle, alluding to the English name bugle-weed.

Lycopus Fuchs, Stirp. 223. (1549) = *Leonurus Cardiaca*.

Lycopus Tour. Inst. Rei. Herb. 190. (1700), Élém. 159. (1694), in which latter work he says: "Fuchs s'est servi de ce nom pour signifier l'agripaume; mais il devient inutile puisque l'usage a autorisé celui de *Cardiaca*. On me permettra donc de débouiller *Lycopus* de son ancienne signification et de m'en servir pour exprimer un genre de plante que porte des fleurs" etc. Linnaeus took the name of Tour. Adanson refers *Lycopus* to Fuchs in Linnaean sense, but is wrong.

892. **Phytosalpinx americana** (Muhl.) Lunell.

Lycopus americanus Muhl.; Bart. Fl. Phil. Prodr. 15. (1815).

Lycopus sinuatus Ell Bot. S. C. & Ga. I: 26. (1817).

Leeds. Butte, Pleasant Lake, Turtle Mountains; Kulm (Brenckle).

893. **Phytosalpinx aspera** (Greene) Lunell.

Lycopus asper Greene, Pittonia 3:39. (1898).

Leeds, Pleasant Lake, Turtle Mountains.

894. **Phytosalpinx lucida** (Turez.) Lunell.

Lycopus lucidus Turez.; Benth. in DC. Prodr. 12: 178. (1848). Pleasant Lake.

MENTHA Plinius XX:13, XIX:36 (*Menta*); Tour.; Wimm.

Grab. Fl. Siles. P. 2, p. 177. Gen. 280. *Minthos* Hippocrates.
Minthe Theoph. Hist. 2:5.

895. **Mentha arvensis** var. **glabrata** (Benth.) Fern. in Gray's
Man. VII.: 711. (1908).

Mentha canadensis var. *glabrata* Benth. in DC. Prodr. 12:
173. (1848).

Mentha arvensis Penardi Briq. Bull. Herb. Boiss. 3: 215. (1895).

Mentha Penardi (Briq.) Rydb. Bull. Torr. Bot. Club 33: 150.
(1906).

Leeds, Peninsula of Lake Ibsen, Pleasant Lake.

896. **Mentha arvensis** var. **canadensis** (Linn.) Briquet, l. c.
Mentha canadensis Linn. Sp. Pl. 577. (1753).

Leeds, Peninsula of Lake Ibsen, Pleasant Lake.

Family 109. **SOLANACEAE** Pers. Syst. I: 214 (1805).

NICANDRA Adans. Fam. Pl. 2: 219. (1763).

Physalodes Boehm in Ludwig, Def. 42. (1760). Undesirable
name, built on *Physalis*.

897. **Nicandra physalodes** (Linn.) Adans. l. c.

Atropa physalodes Linn. Sp. Pl. 181. (1753).

Kulm (Brenckle).

PHYSALIS Diosc. 4: 61 and Ruell. translation 337. (1547).

Alkekengi Lonicer (1551?)

Vesicaria Cordus, also *Caesalpinus*, *Gesner*, *Castor Durante*;
Dodonaeus, *Gall* 302 (1557), and his *Vesicaria vulgaris* is = type
P. Alkekengi, and he refers *Vesicaria* to *Plinius*, Hist. XXII: 31.

898. **Physalis virginiana** Mill. Gard. Dict. ed. 8, n. 4. (1768).

Leeds, Butte, Minnewaukan, Dunsieith.

899. **Physalis heterophylla** Nees, Linnaea 6: 463. (1831).

Dickinson (Bergman).

900. **Physalis rotundata** Rydb. Mem. Torr. Bot. Club. 4:
352. (1896).

On dry plains.

SOLANUM Plinius, Hist. XXII: 31. Tour. Linn. Gen. 144.

145. (1737).

901. **Solanum nigrum** Hippocr. Wk. 875; Nicand. Ther.
94. 878; Theophr. Hist. Pl. locis variis; Diosc. 1: 4. 71 = $\sigma\tau\rho\upsilon\chi\rho\varsigma$
 $\omega\epsilon\lambda\varsigma \chi\eta\tau\alpha\iota\omega\varsigma$; Linn. Sp. Pl. 186. (1753).

Leeds, Peninsula of Lake Ibsen.

902. **Solanum triflorum** Nutt. Gen. Pl. I: 128. (1818).

Leeds, Peninsula of Lake Ibsen; Fort Mandan (type locality).

903. *Solanum tuberosum* Linn.
Leeds.
NYCTERIUM Ventenat, Malm. Sub. I: 85. (1803).
Solanum Linn., in part.
904. *Nycterium rostratum* Link. Enum. Hort. Berol I: 189. (1821).
Solanum rostratum Dunal, Sol. Syn. 234. (1813).
Solanum heterandrum Pursh, Fl. Am. Sept. 156. (1814).
Nycterium heterandrum Heynh. Norm. II. 440. (1840).
Androcera lobata Nutt. Gen. I: 129. (1818).
Androcera rostrata (Dunal) Rydb. Bull. Torr. Bot. Club 33: 150. (1906).
Waste places.
LYCOPERSICON Galen. DeFac. Simpl. 4, also Anguillara Sempl. 217. (1561), Mill. Gard. Dict. ed. 7. (1759).
905. *Lycopersicon Galeni* Anguillara l. c., also C. Bauhin Pinax 16. (1623).
Lycopersicon esculentum Mill. Gard. Dict. ed. 8. (1768).
Tumate americanorum Guilandini.
Leeds.
STRAMONIA Fuchs. Hist. Pl. 232 b. (1546). *Tragus*. Dod. Gesn. Camerarius, Chalraas.
Melospinus Tragus, St. Comm. 866. (1552).
Datura Acosta Tract. Drog. (1578). *Stramonium peregrinum* Lob. Adv. 1576 (1603), not *Sir. peregrinum* Dod. (1557)=*Lycopersicum esculentum*. *Stramonium spinosum* Gerard Herb. 277. (1597).
906. *Stramonia foetida* (*Stramonium foetidum* cor.) Arabes (pro certo); Scop. Fl. Carn.
Datura Stramonium Linn. Sp. Pl. 179. (1753).
HYOSCYAMUS Diosc. 4:69, Plin. Tourn.
Kulm (Brenckle).
907. *Hyoscyamus niger* Plinius 25: 4. Linn. Sp. Pl. 179. (1753). *Τοσκίαμος μέλας* Diosc. l. c. acc. to Daubeny (acc. to Bubani= *H. albus*!).
Hyoscyamus vulgaris Nicander, Alexiph. 413; Gesner, Hort. Germ.; J. Bauhin, Hist. Pl.; Ray.
Family 110. **SCROPHULARIACEAE** Lindl. Nat. Syst. ed. 2. 288. (1826).

VERBASCUM Plinius Hist. xxv: 10. φλομῆς Hippocr.
also Diosc. 4: 102.

908. *Verbascum leptophyllum* Fuchs. Hist. Stirp. p. 183;
Cord. (V.) Hist. Pl. 1, 2, c. 116.
Verbascum Blattaria Linn. Sp. Pl. 178. (1753).
Fargo.

LINARIA Brunfels, Herb. 2: 43. (1532).

909. *Linaria vulgaris* Brunfels l. c.; Tragus Stirp. Hist. 356;
Mill. Gard. Dict. ed. 8, No. 1. (1768).
Antirrhinum Linaria Linn. Sp. Pl. 616. (1753).
Leeds.

SCROPHULARIA Brunfels, Hist. Vic. Ic. I: 216. (1532).
Scrophularia peregrina L. = *Galeopsis* Diosc. 4: 93.
Scrophularia chrysanthemifolia L. = ἡ ἐτερα Σιδερίτις (ἡ τρίτη),
Diosc. 1, c.

910. *Scrophularia occidentalis* (Rydb.) Bicknell, Bull. Torr.
Bot. Club 23: 315. (1896).
York, Pleasant Lake, Thorne.

911. *Scrophularia leporella* Bicknell in Bull. Torr. Bot.
Club 23: 317. (1896).
Benson Co., acc., to specimen deposited in the Gray Her-
barium by the writer in 1906.

PENTSTEMON Mitchell 1748 & 1769, see Am. Midl. Nat.,
Vol. III. 157. (1913); Soland. in Ait. Hort. Kew. 3: 511. (1789).

912. *Pentstemon cristatus* Nutt. Gen. 2: 52. (1818).
Dickinson (Cl. Waldron.)

913. *Pentstemon albidus* Nutt. Gen. II: 53. (1818).
Leeds, Butte, Pleasant Lake.

914. *Pentstemon gracilis* Nutt. Gen. II: 52. (1818).
Leeds, Butte.

915. *Pentstemon grandiflorus* Nutt. in Fras. Cat. (1913).
Mandan (Bergman.)

916. *Pentstemon acuminatus* Dougl.; Lindl. Bot. Reg. 15:
pl 1285. (1829).
Medora (Cl. Waldron).

917. *Pentstemon angustifolius* Pursh, Fl. Am. Sept. 738.
(1814).
Dickinson (Cl. Waldron).

MIMULUS Linn. Hort. Upsal. 176. (April 26, 1748).

Cynorrhinchium Mitchell, Act. Ac. Carol. 8 or Ephem. Norim. (1748), see Am. Midl. Nat. Vol. III. 157. (1913).

918. **Mimulus ringens** Linn. Sp. Pl. 634. (1753). Jamestown; Harwood (Bergman).

919. **Mimulus Geyeri** Torr. in Nicoll. Rep. Miss. 157. (1843). *Mimulus Jamesii* T. & G.; Benth. in DC. Prodr. 10: 371. (1846). "Fresh water springs, Devils Lake" (type locality); fresh water spring, Pleasant Lake.

MONNIERA P. Br. Civ. & Nat. Jam. 269. (1755).

Herpestes Gaertn. Fruct. & Sem. 3: 186. (1805).

920. **Monnieria rotundifolia** Michx. Fl. Bor. Am. 2: 22. (1803). *Herpestes rotundifolia* Pursh., Fl. Am. Sept. 418. (1814). Emmons County, (Brenckle).

GRATIOLA Matthioli, Il Susaride, p. 449. (1552); Dodoneaeus, Gall. (1557); Linn. Gen. 333. (1737) & 11. (1754).

921. **Gratiola virginiana** Linn. Sp. Pl. 17. (1753). Leeds.

ILYSANTHES Raf. Am. Nat. 13. (1820).

922. **Ilysanthes dubia** (Linn.) Barnh. Bull. Torr. Bot. Club 376. (1899), acc. to Kew Index.

Gratiola dubia Linn. Sp. Pl. 17, (1753).

Ilysanthes attenuata Small in Bull. Torr. Bot. Club 23. 297. (1896). Wild Rice (O. A. Stevens).

LIMOSELLA Lindern, Tournef. Alsalt 5. (1728), ex. Linn. Fl. Lapp. 206. (1737).

Plantaginella Bauhin, Pinax 190. (1623).

923. **Limosella aquatica** Mera ad Clusium (1593); Linn. Sp. Pl. 631. (1753). *Plantaginella palustris* Bauhin, Pinax I. c.

Menyanthoides palustris Vail Par. 126. (1787). Ward County: Des. Lacs; Leeds (rare).

VERONICA Fuchsius Pl. Hist. 60 (1546) and probably in an earlier edition of (1542); Tour. 60. (1700); Linn. Gen. 14. (1737) and 10. (1754).

924. **Veronica scutellata** Gesner. Op. Bot. Schmied. ed. tab. aen. 10. f. 87 (1751-1771); Linn. Sp. Pl. 12. (1753). Peninsula of Lake Ibsen (extinct).

925. **Veronica acutifolia** Gesn. de Stirp. Coll. (in Kyb.

Lex. Arg. 1553) and (Wolf. ed. 1587); Caesalp. Herb. Thornab 173. (1563); Gilib. Exerc. Phytolog. p. 109. No. 69.

Veronica Anagallis aquatica Linn. Sp. Pl. 12. (1753).

Willow Creek near Dunsieht; Kulm (Brenckle).

926. **Veronica americana** Schwein.; Benth. in DC. Prodr. 10: 468. (1846).

Pleasant Lake.

927. **Veronica xalapensis** H. B. K. Nov. Gen. & Sp. 2: 389. (1817).

Veronica peregrina Am. Authors; not Linn.

Leeds.

AGALINIS Rafinesque. N. Fl. 2. 61 (1836).

Gerardia Plumier, Nov. Gen. Pl. 30. (1703); Linn. Gen. 181. (1737), 266. (1754). The type G. is a South American plant. The consensus of N. Am. Bot. (except Harvard Univ.) is that there is no real *Gerardia* in U. S.

1220. **Agalinis aspera** (Dougl.) Britton in Ill. Flor. 2nd ed. 211. (1913).

Gerardia aspera Dougl.; Benth. in DC. Prodr. 10: 517. (1846).

Pingree (Stutsman County).

928. **Agalinis Greenei** Lunell, sp. nov.

Planta annua, gracilis, 10–30cm. alta, plerumque simplex, infra autem interdum ramea. Caulis inferne glabratu, superne asper, in angulis saltem. Folia linearia pilis rigidis brevibus albis marginata. Inflorescentia caulisi et ramorum racemosa, pedicellis florum brevibus oppositis ex axillis foliorum exortis. Corolla circiter 1.5cm. longa roseo-purpurea, extus breviter pubescens. Capsula obconica, circiter 7mm. alta, aequa longa atque calyx vel eo brevior. Semina atra "argyreo"-punctata. Folia et flores exciscandi colores naturales retinent.

Annual, slender, 10–30cm. high, mostly simple, but sometimes branching even below the middle, the branches usually being so short as to give a virgate appearance to the stem, which is glabrate below and rough above, at least on the angles. Leaves linear, with stiff, short, white hairs on the margins. Inflorescence racemously arranged on the stem and branches, with the short-pedicelled flowers opposite (one of them often only rudimentary) in the leaf axils. Calyx teeth triangular-lanceolate, 1-3—1-4 as long as the tube. Buds cream-colored. Corolla about 1.5 cm. long, rose-purple, short-pubescent without. Capsule obconical, about 7mm.

high, 4mm. wide near the top and gradually becoming narrower toward the base, as long as the calyx or even shorter. Seeds black, "silvery" dotted. Leaves and flowers retain their natural colors in drying.

In ditches with the subsurface clay bare; Leeds (extinct in the type locality, but in 1916, August 28, found in another ditch, not far from the original spot).

Its nearest ally, *A. aspera*, is a larger plant, 30-60mm. high, fastigiate branched, with its lower branches longer than the upper, flowers opposite or alternate in the axils of the leaves, calyx teeth triangular-ovate, about 1-2 as long as the tube, corolla about 2.5 cm. long, deep purple, capsule ellipsoid, about 10mm. high, almost twice as long as the calyx, the herbage blackened in drying, and it is a plant of the dry plains and hills.

On August 19, 1915 Dr. Edw. L. Greene, accompanied by the writer, had a short buggy ride in the country adjoining Leeds. He was too weak to leave his seat, and whenever some plants attracted his attention, I went for them and dug them up. The last plant we made an effort to locate was the one just described. One or two years earlier I had found it in a ditch, but since then some rural nature mender had made a pasture of the plot, and the ditch had ceased to be a refuge for this plant. It was now extinct, and later in the day Dr. Greene was too tired to look for it in my herbarium. He insisted that *A. aspera* grows only in dry, elevated ground, never in ditches, and that this must be a distinct species.

The foregoing statement I trust will serve as a reasonable explanation why it happened that the plant here described was named in his honor, it being the last one the beloved, immortal master looked for during his last visit to his floral realm.

929. *Agalinis Besseyana* Britton, Ill. Flor., 2nd ed. 211. (1913).

Gerardia Besseyana Britton, Mem. Torr. Bot. Club 5: 295. (1894).

Gerardia tenuifolia var. *macrophylla* Benth. Comp. Bot. Mag. I: 209. (1835). Not *G. macrophylla* Benth.

Leeds (extinct). Jamestown.

CASTILLEIA Mutis; Linn. f. Suppl. 47. (1781).

930. *Castilleia sessiliflora* Pursh, Fl. Am. Sept. 738. (1814). Butte, Towner.

ORTHOCARPUS Nutt. Gen. 2: 56. (1818).

931. **Orthocarpus luteus** Nutt. Gen. 2:57. (1818).

Leeds, Des Lacs; Kulum (Brenckle).

PEDICULARIA Tragus, St. Hist. 249. (1552)—he has *Pedicularia*; Tourn. 77. (1700); Linn. Gen. 184. (1737), 726. (1754).

932. **Pedicularia lanceolata** Michx. Fl. Bor. Am. 2: 18. (1803)
Towner, Pleasant Lake.

Family 111. **LENTIBULARIACEAE** Lindl. Veg. Kingd. 686.
(1847).

LENTIBULARIA Gesner. Col. Stirp. (1587), Rir. Mon. 58.
(1690).

Utricularia Linn. Gen. 5. (1737), 11. (1754).

933. **Lentibularia vulgaris** var. **americana** (Gray) Nwd. &
Lil.

Utricularia vulgaris var. *Americana* Gray.

Leeds.

934. **Lentibularia intermedia** (Vaillant) Nwd. & Lil.

Utricularia intermedia Vaillant, Mem. Ac. Sci. 28. (1719).?
Ehrh. Beitr. 5:178; Hayne in Schrad. Journ. Bot. I: 18. (1800).

Towner; Walhalla (No. 389, L. R. Waldron).

Family 112. **OROBANCHACEAE** Lindl. Nat. Syst. ed. 2:
287. (1836).

APHYLLON Mitchell, Diss. Brevis de Prin. Bot. et Zool.
cum Append. Aliquot Gen. Pl. etc. Norimbergae (1769), 1st
edition (1748).

Thalesia Raf. Am. Month. Mag. 2:267. (1818).

935. **Aphyllon fasciculatum** T. & G. in Gray. Man. ed. 2:
281. (1856).

Orobanche fasciculata Nutt. Gen. Pl. 2: 59. (1818).

Thalesia fasciculata (Nutt.) Britton, Mem. Torr. Bot. Club
5: 298. (1894).

Fort Mandan (type locality). On *Artemisia frigida* Leeds,
Butte; on *Artemisia caudata* Pleasant Lake.

Family 113. **PHRYMACEAE** Schauer in DC. Prodr. II:
520. (1847).

LEPTOSTACHYA Mitchell in Act. Phys.=Med. Nat. Cur.
VIII: 212. (1748). "Dabam ex aedibus meis Virginiae 17 11-3 41"
(Mitchell), when he presented his new genera, meant as a supplement
of Am. plants to Linnaei Gen. (1737), but L. overlooked it

with some other genera. It should have precedence over *Phryma* Linn. Gen. Nov. 1092. (1751), ex *Amoen. Acad.* also.

936. **Leptostachya carolinensis** O. Kuntze, Rev. Gen. Pl. I: 508. (1891).

Phryma leptostachya Linn. Sp. Pl. 601. (1753).

Pleasant Lake; Wahpeton (Bergman).

Family 114. **PLANTAGINEAE** Vent. II: 269. (1799).

PLANTAGO Plinius XXV: 8 vel. 39. *Themison* Plinius ibid.

937. **Plantago major** Cuba Hort. Sanit. 308. (1485); Fuchs Hist. Stirp.; Camer.; Linn. Sp. Pl. 112. (1753).
Butte.

938. **Plantago major** var. *luxuriosa* Lunell in A. Midl. Nat. Vol. I: 236. (1910).

Turtle Mountains, Pleasant Lake.

939. **Plantago asiatica** Linn. Sp. Pl. 113. (1753).

Leeds, Pleasant Lake.

940. **Plantago nitrophila** A. Nels. Bull. Torr. Bot. Club. 29: 405. (1902).
Bottom of dry coulée, Leeds; dry bottom of Lake Ibsen.

941. **Plantago minor** Plinius I. c.!! also Fuchsius Hist. 14. (1546); not *P. minor* Fries, which is = *P. tenuiflora* W. Kit.

Plantago lanceolata Cuba Hort. Sanit. ed. Germ. no. 308. (1485)¹ *Plantago lanceolata* Tabern. Krtb. 2. 1111; Tragus, Stirp. Hist. 225; J. Bauhin, Hist. Pl. 3: 31; Linn. Sp. Pl. 113, (1753).
Fargo (Cl. Waldron); Kulm (Brenckle).

942. **Plantago eriopoda** Torr. Ann. Lyc. N. Y. 2: 237. (1827).
Leeds.

943. **Plantago Purshii** Roem. & Schult. Syst. 3: 120. (1818).
Plantago gnaphalooides Nutt. Gen. I: 100 (1818).

Plantago patagonica var. *gnaphalooides* Gray. Man. ed. 2: 269. (1856).
Towner; Emmons County (Brenckle).

944. **Plantago aristata** Michx. Fl. Bor. Am. I: 95. (1803).

Plantago patagonica var. *aristata* Gray. I. c.

Glen Ullin (Bergman).

945. **Plantago elongata** Pursh, Fl. Am. Sept. 729. (1814).
Dickinson (Cl. Waldron).

¹ "Es ist auch eyn ander krut, plantago genannt, die heyszet zu latin *lanceolata* wan sye wechset uff mit spitzen bletttern als eyn lantz ysen."

Family 115. **RUBIACEAE** B. Juss. Hort. Trian. (1759).
CHAMISME (Raf.) Nwd. in Am. Midl. Nat. Vol. IV. 92.
(1915).
Houstonia segregata.
946. **Chamisme ciliolata** (Torr.) Nwd. l. c.
Houstonia ciliolata Torr. Fl. N. U. S. I: 173. (1824).
At least the lower leaves are ciliolate. Leeds, Butte (rare).
GALIUM Diosc. 4: 96 (4:80 in Ruellius' edition). *Aparine* Theophr., not *Galium Aparine* Theophr.! *Lappa* Virgilius ex Fee. Fl. Virg. 75, also Plinius XXI: 17, ex Fee.
947. **Galium Aparine** Linn. Sp. Pl. 108. (1753).
Aparine aspera Thalious, Sylva Herc. 10. (1588).
Aparine vulgaris C. Bauhin, Pin. 334. (1623).
Peninsula of Lake Ibsen.
948. **Galium boreale** G. Bauhin, Pin. 145; Linn. Sp. 108.
(1753).
Devils Lake, Turtle Mountains.
949. **Galium boreale** var. *linearifolium* Rydb.
Leeds, Butte, Oberon.
950. **Galium luteum** (Diosc.) Ruellius, Nat. Stirp. 124.
(1543), also Ruellius, Diosc. 350. (1547); Cord., Pen., Lob., G.
Bauhin, Zannich.; Gilib. Exerc. Phyt.
Galium verum J. Bauhin, Linn. Sp. Pl. 107. (1753).
Dickinson (Cl. Waldron).
951. **Galium triflorum** Michx. Fl. Bor. Am. I: (80) (1803).
Peninsula of Lake Ibsen, Towner, Turtle Mountains.
952. **Galium trifidum** Linn. Sp. Pl. 105. (1753).
Peninsula of Lake Ibsen.
Family 116. **CAPRIFOLIACEAE** Vent. Tabl. 2: 593. (1799).
VIBURNUM Virgilius. "Quantum lenta solent inter viburna
cypressi."—Ecl. I: 26, ex Fee. Fl. Virg.; Matthioli, Comment.
Diosc. 124. (1554); Gesner, Hort. Germ. 185. (1561); Camerarius,
De Plant. Epit. 122. (1586); Castor Durante = *V. Lantana* Linn.,
not *V. Tinus* as Britton would have us believe in Ill. Fl. III:
269. (1913). *Tinus* and *Viburnum* may be considered separate
genera [See Spach VIII: 315. (*Tinus*) and 306. (*Viburnum*).
(1839)].
953. **Viburnum Opulus** var. *americanum*.
Pleasant Lake, Turtle Mountains.

954. **Viburnum Lentago** Linn. Sp. Pl. 268. (1753).
Turtle Mountains, Pleasant Lake, Devils Lake.

955. **Viburnum Lentago** var. *sphaerocarpum*.
Minot.

SYMPHORICARPOS Juss. Gen. 211. (1789).

956. **Symporicarpos pauciflorus** (Robbins) Britt. Mem.
Torr. Bot. Club 5: 305. (1894).
Symporicarpos racemosus var. *pauciflorus* Robbins; A. Gray
Man. ed. 5: 203. (1867).
Turtle Mountains.

957. **Symporicarpos occidentalis** Hook. Fl. Bor. Am. I:
285. (1833).
Leeds, Peninsula of Lake Ibsen, Devil's Lake.

CAPRIFOLIUM Cuba Hort. Sanit. 139. (1485) = *Lonicera Caprifolium*.

958. **Caprifolium glaucescens** (Rydb.) Nwd. & Lll.
Lonicera glaucescens Rydb. Bull. Torr. Club. 24: 90. (1897).
Lonicera Douglasii Hook. Fl. Bor. Am. I: 282. (1833). Not
Caprifolium Douglasii Lindl. (1830).
Towner, Devils Lake, Turtle Mountains.

959. **Caprifolium tataricum** (Linn.) Nwd. & Lll.
Lonicera tatarica Linn. Sp. Pl. 173. (1753).
Leeds.

Family 117. **CUCURBITACEAE** B. Juss. Hort. Trianon
(1759).
MICRAMPELIS Raf. Med. Rep. (II.) 5: 350. (1808).
Echinocystis T. & G. Fl. N. A. I: 540. (1840).

960. **Micrampelis lobata** (Michx.) Greene, Pittonia 2:
128. (1890).
Sicyos lobata Michx. Fl. Bor. Am. 2: 217. (1803).
Echinocystis lobata T. & G. Fl. N. A. I: 542. (1840).
Towner, Minot.

Family 118. **CAMPANULACEAE** Juss. Gen. 163. (1789).
CAMPANULA Fuchsius, Fl. 151 b. (1646), Dodonaeus, etc.

961. **Campanula intercedens** Witasek. Abh. Zool. Bot. Ges.
Wien I, III, 43.
Leeds, Towner.

962. **Campanula intercedens** var. (described and perhaps
named in some manuals, but I have been unable to find the name.)

Tall and slender, leaves very thin and elongated, often 1 dm. long.
Pleasant Lake.

963. *Campanula sibirica* Linn. Sp. Pl. 167. (1753).
Belfield (O. A. Stevens).

PETROMARULA Belli (1601) ex Clusio Rar. Plant. Hist. pag. CCXCIX. Epis. ad Clusium. Not *Petromarula* Vent. Hedw. f. Gen. 139. (1806) = *Phyteuma*.

Lobelia Linn. Fl. Lapp. 227. (1737), Gen. 267. (1737). Not *Lobelia* Plum. Nov. Gen. Pl. 231. (1703). Contradicente Linn. ipso in Gen. Pl. 1737, l. c. quia Plumieri planta habet "fructum C. mollem, ovatum, succi plenum & ossiculo D. foetum oblongo," etc. = *Scaevola* Linn. Mant. 145. 1771).

Rapuntium Columna (1649); Morison, Hist. 2466; Hernandez; Tour. Inst. 163. (1700); Boerhave, Plumier, Spec. 5.

Cardinalis Rivini Rupp. Gen. 201. (1726).

Dortmanna Rudbeck, Act. (1720) p. 91. t. 2 (as to *Dortmanna*, if not a separate genus).

964. *Petromarula hirtella* (A. Gray) Nwd. & Lll.

Lobelia hirtella (A. Gray) Greene, Pittmania III. 349. (1898).

Lobelia spicata hirtella A. Gray, Syn. Fl. 2: 6. (1878).

Leeds, Butte.

965. *Petromarula strictiflora* (Rydb.) Nwd. & Lll.

Lobelia strictiflora (Rydb.) in Bull. Leeds Herb. No. 2, p. 8 (1908).

Lobelia Kalmii strictiflora Rydb. Fl. of Montana 378. (1900).

Butte, Towner.

Family 119. **CICHORIACEAE** Reich. Fl. Excurs. 248. (1831). Caesalp. De Plant. (1583), p. 506: . . . "Cap . . . Primum . . . Iam prosequamur Cicoriaceae, quae propter aqueam humiditatem frigido constant temperamento; plurima autem suco lacteo constant, qui adultis magis inest, quo tempore et amariora redduntur, et minus esui apta, cum caulescent. Flos omnium numerosis foliolis constat, luteis aut caeruleis; semina autem magna ex parte papposa sunt."

TRAGOPOGON Theophr. Hist. Plant. 7:7 = *Tragopogon porrifolius* = *Come* of Plinius, 21: 15, 28: 13; Diosc. 2: 173; Tour. Élém. 379. (1694); Linn. Gen. 235. (1737).

966. *Tragopogon porrifolius* Linn. Sp. Pl. 789. (1753).
Leeds.

INTRODUCTION TO A STUDY OF BIRD LIFE.

BY EDWARD WILLIAM AND BROTHER ALPHONSUS, C. S. C.

Very early in the life of every child that is brought into the presence of nature, there springs up in his heart a sympathy and love for the beautiful creatures that a kind Creator has made to fly and to sing. Especially is this true of the more fortunate children who live in the country, and early learn the secrets that nature reveals to them. As the country boy grows up he insensibly finds in everything that meets his eyes, in the beautiful panorama spread out before him, countless charms to quicken his fancy and strengthen his mind. In fact, he enjoys with nature a true companionship, but especially is this so with his feathered friends, the birds.

While enjoying this delightful companionship, our country-bred boy is forming one of the most useful and necessary habits—that of observation. First he sees things, and gradually comes to know much that is suggested by what he observes. Then he develops the power of comparing things, and here he enters a region that proves exceedingly rich in storing his mind with the lore of nature, and is yet more fruitful in exercising and perfecting his mental faculties. And among all that he sees and hears, nothing appeals to him more keenly than the multitudinous bird life by which he is surrounded.

After observing for some time, our country boy has become a youth, and with his mind developed by the best of teachers—nature, he enters high school, where his intellect must meet many others. Already so well equipped in some ways, he eagerly takes part in the discussion of the class-room, and in due time will, if endowed with good talents, easily be among the best of his classmates. Here he shines in the study of natural history, and his teacher is quite certain to trust any of his observations. Familiarity with manuals on bird life will soon make him a competent ornithologist. From the school to the specialists' club is but an easy step for our young naturalist, and his membership is welcome even to the experienced ornithologists whom he there meets.

But let us retrace our way a little, and note more carefully how our young ornithologist learned to identify so many birds.

At first he observed the migration and habits of the more common species, and either gave them names himself, or used those that other farm boys had coined. Often these names would not be correct—that is, they would not be authorized by the standard bird books—and sometimes the same name might be used for different species in different localities. For instance, in some places the Goldfinch is called by the boys the Wild Canary; in other parts of the country this name is given to the Yellow Warbler. Another species with many popular names is known by the uninitiated as the Yellow-hammer, the most familiar names to ornithologists being Flicker, High-hole, or Golden-winged Woodpecker. But at first, names are unimportant, the main thing is to be sure of knowing all the species that are found in one's locality at the various seasons of the year. In this respect, our farm boy is very keen, and will in a surprisingly short time be well acquainted even with the shiest bird that appears in the blackberry bushes in his father's garden.

For a long time our young naturalist has depended entirely upon his quick and keen vision in all his observations; but after becoming a member of the local ornithological club, he finds his associates all use field glasses for their observations. Occasionally, too, when desirous of securing a rare specimen, or one that is rare at a certain season of the year, they resort to using a gun to take the coveted prize. So our aspiring ornithologist easily follows the lead of his older scientific friends, and does a little shooting, and much observing with his field glasses. By these means he succeeds in adding a number of warblers or fly-catchers, which he had not previously identified, to his list of local birds.

The seasons of the year come and go with their wonted regularity, and each one finds our naturalist unabating in his devotion to the delightful study of ornithology. Ten years make many changes in the life around us—in persons no less than in things. At the end of this period our unsophisticated farm boy has become a well set-up and respected citizen in one of the university towns of Indiana. And the reader will not be surprised to learn that one who early gave so much promise of developing into a man of intelligence and integrity, after graduating from his university, is now a member of its faculty, holding the position of assistant instructor in zoology. From this on, we shall let the young professor speak for himself, and give the later story of his career as an ornithologist.

It is with pleasure that I begin to relate to you my experiences in the study of bird life. Having been introduced to you by my esteemed friend and fellow-naturalist, Brother Alphonsus, of Notre Dame University, I shall proceed without further allusion to the early part of my career. I soon found that to do efficient work as an ornithologist, I would have to make three divisions of my subject—namely, migration, distribution, and habits of birds. I also found that I could not simultaneously pursue all of the three divisions, for a different method would be required—at least to study the habits of birds. For this purpose the observer must not move much, but must patiently pick up the many interesting things about the life of a bird that are revealed to the careful and persistent student. In fact, ten years would not be too long to devote, either to the study of the habits, or the migration and distribution of our birds. I began with the latter division for a number of reasons, mainly these: in studying the migration and distribution of birds, the observer has better opportunities to add new species to his ever growing list; he also gets needed exercise from the constant walking that is necessitated to find as many migrants as possible.

Incidentally, I may say, the student of bird life receives a great deal of pleasure in his long and solitary rambles—with only nature for his companion. Sounds and sights attract him everywhere, and his power of attention is wonderfully strengthened. He knows too, from experience, where to look for the many different species, which are not all found in the same places. Here again there is introduced the element of variety; some days, too he finds more species than on others.

I think it helpful at the beginning of this paper to give my readers some idea of the character of the land near my university home. The general appearance of the country is part wood and part prairie; in the immediate vicinity of the buildings, there are two small lakes—formerly one. One of these lakes (that nearest the St. Joseph River, into which it has an outlet) is lower than the other, giving the feature of marsh land. The St. Joseph River, one mile west, is a rapid stream, quite wide, and well-wooded, attracting such species as the Cardinal, Towhee, and Red-eyed Vireo. There are no deep woods nearby, which accounts for the absence in summer of the Scarlet Tanager, Tufted Titmouse, Gnatcatcher, and other species loving seclusion. To get around the territory I have described in outline would require about an

hour and a half, making allowance for frequent stops. Often the writer would stay out but an hour, either going directly to the river, or walking around both lakes.

In gathering data for the study of the migration of birds, not only is sufficient time required, but it must be available daily, or better, morning and evening. Few persons are in a position to be able to give their time regularly to this study, or if they have time for it, their place of residence is not favorable for observations of bird life. The writer has been very fortunate in both these respects, living in such a place as he has described above, and having leisure through a large part of the day. For more than eleven years, season after season, he has gone forth to field and grove to renew his acquaintance with his many beautiful and tuneful feathered friends.

The migration of our birds has proved a most interesting, and in some phases, the most mysterious part of a bird's life. The many dates of arrival and departure of the different species have been compared, and in a considerable number of instances there was found marked irregularity for several seasons. How to account for this irregularity is the mysterious feature of migration. Sometimes it may be inclement weather that causes delay in the arrival of certain species; at other times the weather will be fine, but still the birds may not arrive earlier. Why do they not arrive earlier is an unanswerable question to the writer. And this element of mystery adds new interest to the study of ornithology.

The two seasons of migration—spring and autumn—afford unequal facilities for securing dates of migration, the latter season presenting more difficulties. In spring most of the birds are in song when they arrive; the trees are quite bare yet; and there is a tendency for all the species to delay more on their northward journey: but in autumn, the songs have nearly all died away; many species feed quietly in thick shrubbery; and often others quickly pass southward, fearful of mishaps to their young, which follow them in flocks. And I was told by a reliable ornithologist that there is not available any satisfactory data on the autumn migration of our birds. Here, then, is an unworked field for devoted students of bird life.

The migration and distribution of birds have elements of similarity, at least they need not present much difficulty to the student who tries to study them simultaneously. By recording all

the species seen, and by noting casually an approximate number of each species, any observer will soon learn the relative abundance at any season of the year of all the birds that come under his observation. By comparing his records and notes for several seasons, he will have a very adequate idea of the distribution of bird life in his own neighborhood. This totalling up of records for a number of years is, however, no light task; and in the writer's own experience, has proved veritable drudgery.

While studying the migration and distribution of birds, any observer will incidentally obtain a very fair knowledge of their habits—such as, nesting, bathing, feeding, and the call-notes and songs of birds. Perhaps the most interesting of a bird's habits is its nesting—so various are the nests and the ways and means that are taken to feed and protect the young birds. A typical crude nest is that of the Mourning Dove, while the most marvelous of birds' nests is the hang-nest of the Baltimore Oriole. Then there are the eggs, so variously colored that a set of them may be most beautiful. The feeding of the fledglings, their first attempt at flying, the anxiety of the old birds for the safety of their young, and many other interesting features of the nesting season, are inexhaustible subjects for study or pleasurable investigation.

Next to nesting, I think, the bathing habits of birds are most remarkable. Two general methods of bathing are observable—namely, wading into the water and plashing in it, and flying and dipping into the water. Most birds bathe in the first way, which is much the less interesting. To see a bird fly out over the surface of the water, and suddenly plunge into it—is a wholly surprising performance, even to the experienced observer; for there may be some particular circumstance of the action that is unusual—such as, the number of dips taken—at intervals or successively—the height from which the birds descends into the water, or some other curious element.

One of the most astonishing things that meets the eye of the keen observer is the readiness with which the young birds of a given species adopt the ways of their parents. To us who must be taught everything with the utmost pains, and who with long and careful training, only succeed in doing things clumsily, the alertness of birds to do as their parents is really a great wonder. When barely fledged, most birds begin to feed and fly, and bathe as they see the old birds do. The native power of young birds to

achieve approximately the facility of action of old birds of the same species is a notable point of observation in the study of bird life. This aspect is well illustrated in the case of the Nuthatch family, whose young can climb with almost the same cleverness as the old birds.

After the nesting season there follows a period that may not ineptly be called family days, when the young are more or less dependent on the old birds for food. Baltimore and Orchard Orioles, Bluebirds, Phoebe, Crested Flycatchers, Goldfinches, and many other species are seen in small flocks, which are undoubtedly birds of one or more broods. But the single families speedily grow into larger groups, which often comprise hundreds of the same species. Bronzed Grackles, Cowbirds, Martins, and others fill our fields, or groves, or the air with a multitude of living creatures. One of the most noteworthy sights in autumn is a large flock of Cowbirds flying, the males black and the females brown.

At all times, but especially during the nesting season, birds are exposed to many enemies. Among these are snakes, squirrels, birds of prey, and the domestic cat. Although snakes and squirrels destroy many eggs, it is mostly owls, crows, hawks, and cats that are the greatest destroyers of bird life. My own observations and those of my friends relate mostly to cats that roam at large. When these creatures find a nest, they will watch it persistently, and as the young birds fly weakly out, the cats will pounce upon them. One spring the entire brood of a Catbird was thus killed by a single cat at Notre Dame.

The enemies of birds naturally suggest the problem of their protection. No doubt nature's provision for the safety of all creatures is the most effective. But nature's conditions have been much altered by civilization, and this element has greatly added to the difficulties of conserving bird life and animal life. Artificial arrangements can not be adequately coped with by birds, and so man must step in and meet the adverse situation by special safeguards. More intelligent attention to this subject should be paid by all citizens, but by our State Audubon societies the more efficient protection of our birds should still be more carefully studied.

That birds should be helped to increase and become plentiful, both in town and country, needs no proof at all. The beauty of their bodies, their sweet strains in spring and summer, their use-

fulness in destroying harmful insects to trees and plants, are a few of the reasons why every man and woman should do his or her share in promoting schemes for the protection of our native birds. It seems incredible that there should be so much indifference to one of the most delightful features of the great out-of-doors—the intelligent enjoyment of bird life. But lamentable as this state of things is, let us not be discouraged. If the old are beyond reclamation in the matter of becoming interested in our birds, the young are never so. They but await the helpful word of their teachers or friends, to become life-long lovers of our many beautiful song birds.

Many American birds are strikingly beautiful. Among the most brilliant in plumage we may include the Scarlet Tanager, Rose-breasted Gorgebeak, Cardinal, Indigo Bird, Baltimore Oriole, Blackburnian Warbler, Redstart, and Red-headed Woodpecker. If these species were all seen together, they would make a wonderful collection. And any person who had never seen them before would say he had no idea that such beautiful wild birds were in existence. I remember once the surprise of a girl whose attention was called to a Scarlet Tanager. She could not believe that it was a wild bird, but thought it must have been an escaped cage-bird. The presence of these beautiful feathered creatures in our groves during the summer adds a new charm to their attractiveness.

Were our birds noted only for grace and beauty of form, they would be thrice welcome on their return to us each spring. Besides the exquisite colors of their coats, many of them are sweet-voiced, and make our groves and fields ring with their clear, liquid notes. What a chorus, never unappreciated by the bird lover, may be heard any morning in spring and early summer. The Song Sparrow, Warbling Vireo, Baltimore Oriole, Indigo Bird, Meadowlark, Bobolink, Catbird, and Brown Thrasher are songsters whose performances give the purest pleasure to every sympathetic student of nature. In all there are about forty species of song birds that may be heard in our part of the country, each with its own voice, which can be distinctly recognized.

The voice tones of birds may be musical or may lack that quality. A single note may suffice to determine to which class a given species may belong. Compare the utterances of the Wood Pewee and the Phoebe, and you will note the musical quality in the first and its absence in the second. Another difference between

song birds and most of those which have been denied this gift is that the former, although always singing in a minor key, yet modulate their voice sufficiently to make the song varied; while the latter usually have little range to their voice, and repeat the same unmusical note over and over again. It must be admitted, however, that a number of non-musical birds have remarkable power of voice expression. Who that has listened to Crows or Flickers, or certain other species will not say that they can vary their voices almost indefinitely? So in dividing birds into those which sing, and those which do not, the liquid quality of the notes, rather than the gift of variation, must differentiate the two classes.

I shall now attempt to describe, somewhat in detail, the qualities of bird utterance, dividing the subject into call-notes, songs, and unmusical notes. My purpose is to note such differences as will account for the classification of birds as either musical or non-musical. The two elements, as hitherto stated that will enter mostly into the discussion are variation and quality of tones. I shall also essay to outline what may be called the philosophy of bird utterance. This will consist in an analysis of the notes of birds, not only in relation to the quality and variety of their utterance, but also the motive or stimulus that is the source of the sounds to which birds give expression. In treating this aspect of my subject, I realize that my knowledge is too fragmentary to offer more than mere suggestions or conjectures.

Any one who has studied bird life long and carefully must have often wondered why birds have such a great variety of utterances. Broadly, these utterances may be divided into two kinds—songs and call-notes. Usually the latter are not musical, and this is probably the chief reason for distinguishing them from songs. However, in some species there is no melodious quality either in the call-note or the song. On the other hand, a few species have no call-note that is not musical.

Another interesting thing to the lover of birds is the impulse that causes them to utter their notes. Does a bird sing because it feels joyous? All utterance whether rational or otherwise is, I think, the expression of an inward feeling, either of pleasure or pain. If this is true, then the songs of birds must, from their pleasantness, testify to a sensation of pleasure. And when the observer hears a song repeated continuously through a long summer

day, he must feel certain that the warbler is in a state of exuberant joyousness.

But why is there such a variety of notes in the many common birds of our woods and fields? Each species has voice qualities that are distinct from any other, and even individuals of the same species often manifest great powers of variation in their singing. Speaking generally, I think a bird's song is an inherited gift in this sense, that the elementary powers of utterance are possessed by the bird but depend for development on association with the parent birds.

This development of song power may be noticed in young birds during the period that follows the nesting season, when families of birds wander about for food. Better still in our groves, during July and August, such species as the Bluebird and Baltimore Oriole are common, and here their notes may be heard, especially early in the morning or in the evening. Hearing these notes so frequently, an ear accustomed to distinguish the utterances of birds will readily recognize that efforts of the young birds are characterized by a lack of both sustained execution and of fullness of voice expression.

In some species the most prominent feature of the song is the quality of the notes, which may have but little variety and yet be very pleasing. Such a species is the Bluebird. In others the notes may be clear, but unless the performance is notably fine, the total effect of the song is disappointing. This fact may be easily observed in the Song Sparrow. In judging of a bird's powers of song the quality of the notes seems to weigh most in the mind of the observer. Very often a note will have scarcely any variation, and yet be indescribably sweet or plaintive.

Two species that are notable for great variety in their singing are the Brown Thrasher and the Catbird. There is also considerable similarity in their songs, the Thrasher's performance, however, being easily distinguished by its greater strength and more marked pauses. In some respects the Catbird's song is the more pleasant, for what it lacks in force of expression it makes up in the sweetness of its strain.

The Catbird suggests a faculty that is most remarkable in this species—the power of imitation. Probably this is not an uncommon endowment in many species, and may account for peculiarities of individuals that are noticed in their manner

of singing. No doubt environment plays an important part in the acquisition of new notes in any species, but the degree of assimilation is most dependent on native faculty. In the Catbird this faculty seems more evident than in any other of our northern birds. So accomplished is this species that it can imitate the full song of other species. I remember on one occasion of hearing a Catbird, in full view, singing like a Robin.

Those who spend much time in the country or other places where birds are abundant must have been struck by the frequent occurrence of the same note in many species. Often, too, a single sweet note will be repeated over and over again, a fact that reiterates the truth that repetition is an element of adequate appreciation in other than human expression. Sometimes this repetition of one note reveals more clearly the sweetness of a bird's notes than does its full song. I recall as an example of this the Orchard Oriole.

In some species the notes are very limited in range, but some variety is obtained by a skilful management of the voice. Should the elementary sound be sweet, the bird may succeed in giving it a number of pleasing turns; or the quality of the notes may be so agreeable that the observer will listen eagerly to the oft-repeated, sweet strain. Perhaps no common species is so conspicuous for this habit as the Field Sparrow. Now and again I have heard one whose powers of song, within the limits described above, were remarkably fine.

Our birds may be divided into two general classes—musical and non-musical. Why are all of them not musical? Well, one may as well ask, why are not all birds non-musical? Some have received the gift of song as an endowment, while others have not received this gift. But even those that are not called song birds may have notes that are more or less pleasing. Of course this quality would suffer by comparison with those species whose songs are clearly sweet; but when a bird's notes are judged on their own merits, after frequent and long acquaintance, we will certainly admit that somehow we like them.

There is always in the observer of bird life a subjective feeling that will materially affect his appreciation of the songs of birds. A species that is heard very frequently, like the song sparrow, will—from this very frequency, and not for any intrinsic quality of the song—be regarded with unwonted affection.

And other circumstances connected with this same species—such as, its early arrival, and its long song season—will add to one's preference for the bird. Again some circumstance not at all connected with a bird's life may often make the observer regard its singing as joyous or as most plaintive. An example of this subjective attitude would be some great personal sorrow occurring during a time when a bird's song was heard daily. Still another proof of the power of suggestion will be found in the opposite effect that some bird's song may have on different persons. I remember once asking my mother whether she thought the notes of the Field Sparrow were plaintive. Her answer was that to her they seemed cheery.

Besides their songs all birds have brief call-notes that may or may not be musical—usually they are not. Although these call-notes are seldom of the same quality as the song, yet they are sometimes very striking. Who that has heard in some deep wood the unique call of the Scarlet Tanager will deny that it is very pleasing? Another species whose call-note I have always liked is the Yellow-throated Vireo. But it must be admitted that many species of birds have call-notes that are harsh and scolding. I recall a good example of this in that charming songster the Warbling Vireo.

There is in call-notes a very striking feature that deserves special study on the part of students of bird-life—this is the remarkable power of expression which many species possess in their call-notes. During the nesting season, or when the young have been lately fledged, the old birds will often utter notes of evident alarm or of wild excitement. I remember—after the report of a gun, and the loud yelping of a dog that was shot—hearing a most piercing cry come from a Spotted Sandpiper, the bird taking flight immediately. Another species whose voice has wonderful flexibility is the Crow. One August afternoon, I remember the cawing of many Crows in different parts of a deep wood and was struck by the remarkable variation of each bird's utterance.

An example of a bird whose call-notes may be termed musical is the Goldfinch. I know of no other species that has a greater variety of pleasing notes. To me there is one quality in the notes of the Goldfinch that is unequaled by any other species—this is delicacy; and this quality is most evident in one of the bird's common call-notes. In its more ambitious attempts at singing—

in which its notes somewhat resemble those of the Canary—the Goldfinch often introduces its call-note—not at all to the detriment of the song. When many Goldfinches sing together in the tree-tops, the effect of the song is most pleasing; and perhaps a feature of the singing that adds rather than detracts, from the total effect of the song is the fact that the birds lack loudness in their utterance.

My rather ambitious attempt to give a philosophy of bird utterance may have led the reader to expect something more satisfying than I have been able to offer. Still I hope I have put down my ideas clearly, and that they are not altogether commonplace. Ten years of daily observation have revealed many interesting facts about the notes of our birds, and if I have not done better in my attempted analysis of their utterance, it is, I think, mainly due to lapses of memory. Unless the observer takes copious notes when out-of-doors, he will surely omit much in any effort to describe in detail the almost endless variation, at different seasons of the year, of the utterance of our birds. Hence the thoughts I have set down are more or less of a tentative character which longer experience, and greater efforts to secure the most complete knowledge attainable, may materially modify.

This paper has already grown to a great length; and lest a bird lover's enthusiasm lead me to trespass further on the patience of my readers, I shall end with a brief summary of my subject. It has been my purpose to outline my method of studying ornithology, and to indicate roughly the results of eleven years of daily observation of bird life. I realize that in my attempt to set down in a general way the various aspects of bird life, I have not maintained a unity of plan that the thoughtful reader would expect to find. I may remind him, however, that in an article that purports merely to introduce the subject, variety rather than unity, will be most in evidence. The longest part of the present article has dealt with the notes of birds, because both the writer and the general reader are probably most interested in the songs of birds. I may be pardoned, I am sure, if I venture, as a bird lover, to hope that what I have written will awaken a little more interest and even some enthusiasm in a branch of natural history that is steadily gaining in importance both in school curricula and in nature lover's clubs. It is certain that the next generation will not be indifferent to the varied and abundant bird life of our woods and fields.

NAIADGEOGRAPHY OF MISSOURI.

BY W. I. UTTERBACK.

The writer would presume to use the term, NAIADGEOGRAPHY, because it is a convenient and comprehensive expression for "the geographic distribution of the *Naiades*, or Fresh-water mussels." This coined term is employed here to correspond with that one in good accepted usage, that is, ZOOGEOGRAPHY. However, the latter term is less specific, having reference to "the geographic distribution of animals generally."

After some years of study of the *Naiades* of Missouri the writer has been able to work out a key to the mussel faunae which may be used as a summarized account to precede the tabulated list on NAIADGEOGRAPHY.

- I.—PRAIRIE DRAINAGE. NAIADGEOGRAPHY:—(Ecology:—Streams sluggish, turbid, mud bottom); (Coincidental Morphology:—*Shells mostly large, smooth, inflated*).
- 1.—NORTH MISSOURI FAUNA.—Missouri R. Southern Boundary. Physiography:—Level or rolling plains with lower stream conditions; Coincidental Characters:—*Mussels scarce, mostly lacustrine*.
 - a.—NEW PRAIRIES, OR GLACIAL PLAINS.
 - a1.—MISSOURI RIVER FLOOD PLAINS (*Depauperated Mussel Fauna*).
- 2.—CENTRAL MISSOURI FAUNA.—Missouri R. Northern Boundary. Physiography:—Intermediate Topography and Hydrography; Coincidental Characters:—*Mussels fairly abundant, primitive-modern*.
- II.—OZARK DRAINAGE. NAIADGEOGRAPHY.—(Ecology:—Streams swift, clear, rock bottom); (Coincidental Morphology:—*Shells mostly small, rough, compressed*).
- 1.—CENTRAL MISSOURI FAUNA.—Ozark Crest Southern Boundary.
 - a.—Ozark Border (Lower Osage).
 - b.—Ozark Plateau (Gasconade Basin).
 - c.—Ozark Center (Meramec Basin).
- 3.—SOUTH MISSOURI FAUNA.—Southern Slope of the Ozark Uplift. Physiography:—Dissected Uplift with upper stream conditions; Coincidental Characters:—*Mussels abundant, modern mostly fluviatile*.
 - a.—Ozark Border (S. W. Mo., Neosho Basin).
 - b.—Ozark Plateau (White River Basin).
 - c.—Ozark Center (Black River Basin).

a2.—MISSISSIPPI FLOOD PLAINS AND LOWLANDS (S. E. Mo. *Depauperated Mussel Fauna*). This region and the similar one above (a1) are really separate from both the Ozarks (II) and the Praities (I) since their ecologic conditions, i. e., the excess of loess and other alluvia in their waters, are the causes of their impoverished to extinct mussel faunae.

The author would adopt the same nomenclature in this paper as the one employed in his illustrated and descriptive catalogue of the *Naiades* of Missouri.¹ It may be well to repeat here that the radical changes from that of the Simpsonian system² are due to the acceptance of the Rafinesque Priority as recently revived by Frierson,³ Ortmann,⁴ Vanatta⁵ and other recognized students of *Naiades*; also to a greater recognition of the nutritive and reproductive structures of the soft parts than to the conchological morphology as bases of classification; however, the writer would not disregard the value of shell characters, yet does not consider their constancy so great for taxonomic purposes. In the following list the progressive form of taxonomy is employed and, in most cases, the Lindahl orthographic modification⁶ of Simpson and others is used; however, it is thought that, instead of following the uniform code of not capitalizing names for species in any case, it would be more consistent with Latinic etymology to retain the initial capital in all names of species derived from those of persons when used substantively.

For the sake of clearness the more familiar names, when appearing as synonyms, follow the revised terms as equalities in parentheses, but, in most cases, only the abbreviated name of the author can appear for lack of space. In the accompanying list the geographic distribution (*Naiad geography*) of species and sub-species is indicated thus: — = scarce; X = fairly abundant; + = abundant, as occurring individually; G = General Distribution of Species.

¹American Midland Naturalist, Vol. IV, Plates I-XXIX, 1915-1916; also special paper p. 519.

²C. T. Simpson, Proc. U. S. Nat. Mus., XXII, pp. 504-1044, Pl. XVIII, 1900b.

³L. S. Frierson, Nautilus, XXVIII, p. 6, May 1914; Footnote 5, Mid. Nat., IV, p. 519.

⁴A. E. Ortmann, *op cit.*, as collaborator.

⁵E. G. Vanatta, Proc. Acad. Nat. Sci. Phil., pp. 549-559, Dec. 8, 1915.

⁶Josua Lindahl, Jour. Cinn. Soc. Nat. Hist., 1906.

SUMMARIZED DISTRIBUTION OF MISSOURI MUSSELS.

Gen. Mussel Faunae	No. of Mussel Species and Varieties			Total for each Fauna.
	Primitive (Unioninae)	Intermediate (Anodontinae)	Modern (Lampsilinae)	
1.—North Missouri	22.....	9.....	21.....	52
2.—South Missouri	12.....	4.....	28.....	44
3.—Cen. Missouri	19.....	8.....	26.....	53

In comparing with other lists of *Naiades*, mostly secured by the writer in correspondence with students for the surrounding States, it is found that North Missouri is mostly that of the Mussel fauna of Illinois and Iowa; that South Missouri belongs to the great South-West, i.e., Arkansas, Oklahoma, Louisiana and Texas and that Central Missouri is really a combined or transitional zone for these two sections of the Mississippi Valley. The Numbers in the second column of the following comparative lists represent those Species of the writer's list for Missouri that are identical with those of the lists most representative of the Upper Mississippi and the South-West:

<i>Upper Mississippi</i>		<i>North Missouri</i>
No. Species in Illinois (W. S. Strode's List) ¹	29	No. in common.....29
No. Species in Iowa (T. Surber's List).....	42	No. in common.....40
<i>South-West</i>		<i>South Missouri</i>
No. Species in Ark. (H. E. Wheeler's List).....	50	No. in common.....26
No. Species in Miss. & Tex. (L. Frierson's List) ²	25	No. in common.....15
No. Species in Okla. (B. F. Isely's List) ³	29	No. in common.....29
No. Species in La. (Vaughan & Frierson's List).....	43	No. in common.....21

Many peculiarities are noted in the *Naiadogeography* of Missouri. It is surely a geologic paradox to note a predominance of primitive species of *Naiades*, in the New Prairies, or Glacial Plains. Another problem to be worked out is that of the reason for the limitation of the distribution of *Elliptio dilatata*, *Nephronaias ligamentina* and *Strophitus edentulus*,—Species of the widest and most general distribution in other States. While *S. edentulus* is one of the commonest of shells for Central and South Missouri, yet its occurrence is very doubtful for North Missouri, as the author, in his more thorough investigation of this more accessible part of the State,

¹W. S. Strode, *Nautilus*, V., p. 61, Oct., 1891; IX, pp. 115-116, Feb. 1896.

²L. S. Frierson, *Nautilus*, XXIV, p. 134, Apr. 1911.

³F. B. Isely, U. S. Bureau Fis. Doc. No. 792, pp. 1-24, 1914; U. S. Bu. Fish. Econ. Cir. No. 9, Feb. 17, 1914.

was only able to secure two individuals and these were too immature and small to be assigned to any definite Species although they were so identified as *edentulus* by recognized students. As indicated in the accompanying Key to the Mussel Faunae these eccentricities of distribution are due to the very different faunal and ecologic conditions. Yet Mr. Bryant Walker, that thorough student of *Naiad geography*, comments:—"There are some very interesting problems connected with the distribution of Missouri *Naiades* that should be worked out. The poverty of the fauna of the Missouri Valley, as compared with that of either the Upper Mississippi, or of the rivers that flow south through the Arkansas, is very curious. . . . I have never had sufficient data to attempt to even guess at the solution of it."

As to the depauperated to extinct faunae of the South-East Lowlands and of the immediate waters of the Loess-Alluvial Flood-Plains for the Missouri and Mississippi Rivers the writer agrees with Dr. Paul Bartsch of the Division of Mollusks, U. S. National Museum, and leader of the party for the U. S. Pearl Mussel Investigation of the Mississippi River during the summer of 1908. Dr. Bartsch writes: ". . . we found no *Unios* between the mouth of the Missouri River and that of the Ohio in the Mississippi. This, I believe, is altogether due to the enormous amount of mud emptied by the Missouri into the Mississippi, making it impossible for the forms to exist there. . . . I have reported on the Missouri River as 'The Great Faunal Barrier.'"

Concerning the distinctive characteristics of the Ozark Fauna Dr. A. E. Ortmann remarks:—"The Ozark region apparently is a continuation of the Cumberland Plateau in the fauna of its rivers so that there will be geographic and faunistic relations with the Tennessee-Cumberland System." Mr. L. S. Frierson also makes this comment:—"The appearance of *Truncilla*, *Pleurobema* and other forms, so intimately resembling those of East Tennessee, in the mountain streams of Missouri and Arkansas is an interesting and remarkable fact illustrating the power of environmental factors."¹

The writer is in the position to verify the observations of Ortmann,² Clark and Wilson³ and other field investigators, who have

¹An unpublished paper, read before a Washington (D. C.) Society of Scientists.

²A. E. Ortmann, Proc. Am. Phil. Soc., LII, No. 210, May-Aug., 1913.

³H. Walton Clark, and C. B. Wilson, U. S. Bu. Fish. Doc. No. 781, pp. 1-23.

made source-to-mouth surveys of Ohio Valley streams, after having made similar surveys of the most representative streams of the general faunae of this State, especially those of Central and South Missouri, when, during the summers of 1913 and 1916, it was the writer's pleasure and profit to survey the Osage and White Rivers from head-waters to mouth by means of a row-boat. The author is especially able to vouch for the report that many species, notably those of the most primitive *Quadrulae*, are generally found to be light, rough, compressed forms in the head waters and to become heavier, smoother and more inflated further down stream; e.g., a plicated *Quadrula* may exist as a flat, light (conventional) *Quadrula undulata* (Barnes) in the swifter, shallower head-waters and as the heavy, inflated (conventional) *Q. plicata* (Say) in the quiet, deeper water nearer the mouth. Then, too, in some instances, it has been observed, especially in the Osage survey, that the nacre-color of certain species, such as *Rotundaria tuberculata* (Raf.) and *Elliptio dilatata* (Raf.), is found to be darker in the upper stream sections and fading out toward the mouth.

CRITICAL NOTES ON NEW AND OLD GENERA OF PLANTS.—IX.

BY J. A. NIEUWLAND.

WINTERIA

Winteria Rehm. is but another way of writing *Wintera*. The latter name was used by Murray¹ in 1784. Another name should be used for the fungus. There is perhaps some diminutive form available for those who favor such and we refrain from adding a new one even though the available ones be rather undesirable.

MYRIACTIS

Kutzing's² plant name was preceded by a *Myriactis* Lessing,³ and must receive a new appellation. *Gonodia* may be suggested, named after Eugene Gonod.

Gonodia Nom. Nov.

Myriactis Kutz, (1843) l. c. not *Myriactis* Lessing. (1831) l. c.

Gonodia pulvinatum Nov. Comb.

¹ Murray, Syst. ed. XIV 567 (1784).

² Kutzing, F. T., Phyc. Gen. (1843).

³ Lessing, in Linnaea, VI., 127, (1831).

LECONTE'S UNPUBLISHED WORKS ON PLANTS

As part of E. L. Greene's collection of plants, his library, manuscripts, etc., there was left to the University of Notre Dame a set of unpublished, water-colored original drawings, made by John B. Leconte, evidently intended to illustrate his articles written on Violets, Bladderworts, and a monograph of *Gratiola*. These communications were published by the author in the rare volumes I-IV of the *Annals of the Lyceum of Natural History of New York*. (1824-1837). Leconte probably was unable to bear the expense of reproducing these exquisitely colored plants which were life size, and so they were never published. His notes on *Gratiola* are in Vol. I. p. 103, on *Utricularia* in Vol. I, p. 72, and *Viola*, Vol II, p. 135. The most important work of all his Monograph of the Genus *Viola* in South-eastern Atlantic States, is also absolutely indispensable to the student of Iodography. Rare as the work in the Annals is, the original plates unpublished had not even been ever seen by some of Dr. Greene's most intimate friends. When in fact on one occasion one of them asked him to be allowed to reproduce a single critical species, Dr. Greene considered the request almost audacious.¹

Dr. Greene once told us he came into possession of this unique treasure in a second-hand book-shop in Philadelphia. The collection of drawings numbering 42 had previously been in the hands of Isaac C. Martindale who obtained them when Leconte's effects were auctioned off. Dr. T. Holm, of Washington, informed us that Harvard University has tracings of the illustrations, probably made before Dr. Greene purchased the originals. In several places of Dr. Greene's writings we find references to these plates, and no doubt they helped much to give him such accurate knowledge of our eastern violets, and their identity, a subject in which he was rightly recognized as one of our most careful and exact authorities. He refers to the drawings in Leaflets 1, 2. Because of a reference in *Pittonia* V, 84, it might be inferred that as early as 1898 he had these; for he states then that he "possesses LeConte's unpublished plates." Another reference is found in *Mid. Nat.* III. p. 84.² seems to point to the supposition that Dr. Greene acquired these drawings subsequent to May 1898. (Vide. *Pitt.* III, 313 et. seq.)

¹ " I had quite to my satisfaction identified it (*V. affinis*) by LeConte's description quite anterior to the time when I saw the unpublished figures referred to; and that only confirmed my earlier determination of it."

"Now on arrival in Washington of the LeConte botanical art treasure, as my property, I called Mr. Pollard's attention to these longer and more pointed leaves of this plant, as bringing it nearer than any other of our violets to the poor figure of Hills' *V. obliqua*. I recall that Mr. Pollard more than once came back to study that particular plate and finally to make of me the remarkable request—I do not like to use the less mild term audacious in connection with an old and valued friend—that he be permitted to make a copy of the plate. Doubtless I might have forgotten the whole circumstance of my friend's very special interest in the fine colored plate under which LeConte, now ninety years since had written in pencil: "*V. affinis*" but for his surprising request."

² There is also an article on *Ruellia* Vol. I. p. 140, but there are no drawings in the manuscript of this genus.

These remarkable water-colored drawings made and annotated by Le Conte himself were undoubtedly intended by him to accompany his monographs in the Annals of the Lyceum of New York referred to. Dr. Greene once told us himself that they were very likely left out because of the great expense of reproduction. There are altogether 25 life size plates of Violets, 10 of Bladderworts, and 7 of *Gratiolae*. Some of the last are unfinished as to coloring, and though we had on various occasions seen this work during Dr. Greene's lifetime, we were ourselves hitherto unaware of this last group of illustrations. There are also penciled notes on the margins of the plates by Dr. Greene himself as to the identity of the plants shown.

Mr. Martindale the former owner of this treasure made the following note on the inside of the front cover of the book: "Purchased at the sale of the Library of Dr. J. LeConte, Phila., 5-1884. They are the original drawings of Major LeConte. Isaac C. Martindale."

It was for some time subsequent to the death of Dr. Greene, Nov. 10, 1915, that these plates had been lost or had disappeared. Diligent search was made for the collection without avail. While catalogueing the periodicals of the Green Library we came upon them quite accidentally hidden in an out-of-the-way place and behind some books on the shelves. Dr. Greene had put them there before leaving on his last trip to Washington; for they were not in the library a week previous to his departure.

After carefully weighing matters from all points of view it has been decided to allow reproductions to be made of the unpublished plates of LeConte. The articles in the Annals of the N. Y. Lyceum will be reprinted and accompanied by actual size photographic copies of the plates 43 in all and one photographic copy of Mr. C. Martindale's note in the original cover. Accompanying the facsimile photographic prints we aim to give a short résumé of references to them in Dr. Greene's writings. Owing to the limited number of copies that will appear it will be necessary to request the various institutions, academies and individuals to send in requests beforehand for copies by subscription. If a sufficient number are ordered or asked to be reserved the work will be undertaken. The photographs will be made by the most expert artist that can be had for the work from the most sensitive orthochromatic plates. The prints themselves will be made on highly polished linen-backed paper 7 x 10 inches. Another expert artist has consented to color the prints to the original at an extra cost of 30c. apiece, for those who wish color reproductions. The photographs will be the best that the modern art can obtain, and a sample will be sent to those who wish to examine the nature of the technique, on condition of its immediate return as the cost of making prints is necessarily very expensive. The price is \$25. No copies will be given or made out afterwards. Nor will the work be undertaken unless a sufficient number of subscribers apply. Address:

DIRECTOR OF THE HERBARIUM,

Notre Dame, Indiana.

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NAIAD GEOGRAPHY OF MISSOURI

CLASSIFIED LIST OF NAIADES

	N. E. Mo.
	Mississippi River
	Des Moines River
Family I. MARGARITANIDAE (Ort.)	
Genus I. CUMBERLANDIA (Ort.)	
1.— <i>C. monodonta</i> (Say) (= <i>Margaritana monodonta</i> (Say))	
Family II. UNIONIDAE (Ort.)	
Sub-Family I. UNIONINAE (Ort.)	
Genus II. FUSCONAIA (Simp.)	
2.— <i>F. undata</i> (Bar.) (= <i>Quadrula trigona</i> (Lea))	
(1) <i>F. undata trigona</i> (Lea)	
(2) <i>F. undata trigonoides</i> Frierson M. S. (New Sub-Species)	
3.— <i>F. flava</i> (Raf.) (= <i>Quadrula rubiginosa</i> (Lea))	
4.— <i>F. hebetata</i> (Con.) (= <i>Quadrula hebetata</i> (Con.))	
5.— <i>F. ebena</i> (Lea) (= <i>Quadrula ebena</i> (Lea))	
Genus III. AMBLEMA (Raf.)	
6.— <i>A. peruviana</i> (Lam.) (= <i>Quardula plicata</i> (Say))	
7.— <i>A. rariplacata</i> (Des.)	
8.— <i>A. perlucata</i> (Con.) (= <i>Quadrula perlucata</i> (Con.))	
(3) <i>A. perlucata Quintardii</i> (Cragin)	
9.— <i>A. (plicata) costata</i> (Raf.) (= <i>Quadrula undulata</i> (Bar.))	
Genus IV. MEGALONAIAS Utterback. (New Genus)	
10.— <i>M. heros</i> (Say) (= <i>Quadrula heros</i> (Say))	
Genus V. Quadrula (Raf.)	
11.— <i>Q. pustulosa</i> (Lea)	
(4) <i>Q. pustulosa schoolcraftensis</i> (Lea)	
(5) <i>Q. pustulosa asperata</i> (Lea)	
12.— <i>Q. quadrula</i> (Raf.) (= <i>Quadrula lachrymosa</i> (Lea))	
(6) <i>Q. quadrula contraryensis</i> Utterback. (New Sub-Species)	
13.— <i>Q. nodulata</i> (Raf.) (= <i>Quadrula pustulata</i> (Lea))	
14.— <i>Q. fragosa</i> (Conrad)	
15.— <i>Q. aspera</i> (Lea)	
16.— <i>Q. nobilis</i> (Con.)	
17.— <i>Q. verrucosa</i> (Raf.) (= <i>Tritogonia tuberculata</i> (Simp.))	
18.— <i>Q. metanevra</i> (Raf.)	
(7) <i>Q. metanevra Wardii</i> (Lea)	
19.— <i>Q. cylindrica</i> (Say)	
Genus VI. ROTUNDARIA (Raf.)	
20.— <i>R. tuberculata</i> (Raf.) (= <i>Quadrula tuberculata</i> (Raf.))	
21.— <i>R. granifera</i> (Lea) (= <i>Quadrula granifera</i> (Lea))	
Genus VII. PLETHOBASUS (Simp.)	
22.— <i>P. cooperianus</i> (Lea) (= <i>Quadrula cooperiana</i> (Lea))	
23.— <i>P. cyphius</i> (Raf.) (= <i>Pleurobema aesopus</i> (Greene))	
Genus VIII. PLEUROBEMA (Raf.)	
24.— <i>P. obliquum</i> (Lam.) (= <i>Quadrula obliqua</i> (Lam.))	
(8) <i>P. obliquum plenum</i> (Lea) (= <i>Quardula plena</i> (Lea))	
(9) <i>P. obliquum pyramidatum</i> (Lea) (= <i>Q. pyramidata</i>)	
(10) <i>P. obliquum catillus</i> (Con.)	
(11) <i>P. obliquum coccineum</i> (Con.)	
25.— <i>P. rotillus</i> (Con.) (= <i>Quad. solida</i> (Lea))	

(6) <i>Q. quadrula contraryensis</i> Utterback. (New Sub-Species)		
13.— <i>Q. nodulata</i> (Raf.) (= <i>Quadrula pustulata</i> (Lea))	—	
14.— <i>Q. fragosa</i> (Conrad)	X	—
15.— <i>Q. aspera</i> (Lea)		
16.— <i>Q. nobilis</i> (Con.)		
17.— <i>Q. verrucosa</i> (Raf.) (= <i>Tritogonia tuberculata</i> (Simp.))	+	X
18.— <i>Q. metanevra</i> (Raf.)	X	X
(7) <i>Q. metanevra</i> Wardii (Lea)		
19.— <i>Q. cylindrica</i> (Say)		
Genus VI. <i>ROTUNDARIA</i> (Raf.)		
20.— <i>R. tuberculata</i> (Raf.) (= <i>Quadrula tuberculata</i> (Raf.))	X	
21.— <i>R. granifera</i> (Lea) (= <i>Quadrula granifera</i> (Lea))	+	X
Genus VII. <i>PLETHOBASUS</i> (Simp.)		
22.— <i>P. cooperianus</i> (Lea) (= <i>Quadrula cooperiana</i> (Lea))	X	
23.— <i>P. cyphius</i> (Raf.) (= <i>Pleurobema aesopus</i> (Greene))	X	—
Genus VIII. <i>PLEUROBEMA</i> (Raf.)		
24.— <i>P. obliquum</i> (Lam.) (= <i>Quadrula obliqua</i> (Lam.))	X	
(8) <i>P. obliquum plenum</i> (Lea) (= <i>Quadrula plena</i> (Lea))	—	
(9) <i>P. obliquum pyramidatum</i> (Lea) (= <i>Q. pyramidata</i>)	X	
(10) <i>P. obliquum catillus</i> (Con.)		
(11) <i>P. obliquum coccineum</i> (Con.)		
25.— <i>P. catillus</i> (Con.) (= <i>Quad. solida</i> (Lea))	+	X
26.— <i>P. coccineum</i> (Con.) (= <i>Quad. coccineum</i> (Con.))		
27.— <i>P. missouriense</i> (Marsh)		
28.— <i>P. Utterbackii</i> Frierson (New Species)*		
Genus IX. <i>ELLIPTIO</i> (Raf.)		
29.— <i>E. nigra</i> (Raf.) (= <i>Unio crassidens</i> (Lam.))	X	X
30.— <i>E. dilatata</i> (Raf.) (= <i>Unio gibbosa</i> (Bar.))	+	+
(12) <i>E. dilatata subgibbosa</i> (Lea) (= <i>U. subgibbosa</i> (Lea))		
(13) <i>E. dilatata delicata</i> (Simp.) (= <i>U. subgibbosa delicata</i>)		
Genus X. <i>UNIOMERUS</i> Conrad		
31.— <i>U. tetralasma</i> (Say)	X	X
(14) <i>U. tetralasma comptodon</i> (Say)	X	X
Sul.-Family II. <i>ANODONTINAE</i> (Ort.)		
Genus XI. <i>SYMPHYNOTA</i> (Lea)		
32.— <i>S. complanata</i> (Bar.)	+	X
33.— <i>S. costata</i> (Raf.)	X	X
Genus XII. <i>ARCIDENS</i> Simpson		
34.— <i>A. confragosus</i> (Say)		
Genus XIII. <i>LASTENA</i> (Raf.)		
35.— <i>L. suborbiculata</i> (Say) (= <i>Anodonta suborbiculata</i>)	—	
36.— <i>L. ohioensis</i> (Raf.) (= <i>Anodonta imbecillis</i> Say)	—	
Genus XIV. <i>ANODONTA</i> (Lamarck)		
37.— <i>A. grandis</i> (Say)	+	+
38.— <i>A. dakotana</i> Frierson M. S. (New Species)		
39.— <i>A. corpulenta</i> Cooper	—	
40.— <i>A. Danielsii</i> (Lea)	—	
41.— <i>A. Bealii</i> (Lea)	—	
Genus XV. <i>ANODONTOIDES</i> (Simpson)		
42.— <i>A. ferussacianus</i> (Lea)		
Genus XVI. <i>ALASMIDONTA</i>		
43.— <i>A. calceolus</i> (Lea)		
44.— <i>A. marginata</i> Say (= <i>A. truncata</i> Wright)		
Genus XVII. <i>STROPHITUS</i> (Raf.)		
45.— <i>S. edentulus</i> (Say)	+	+
Sub Family III. <i>LAMPSILINAE</i> (Ort.)		
Genus XVIII. <i>ELLIPSARIA</i> (Raf.)		
46.— <i>E. occidentalis</i> (Con.) (= <i>Ptychobranchus clintonense</i> (Simp.))		
Genus XIX. <i>OBLIQUARIA</i> (Raf.)		
47.— <i>O. reflexa</i> (Raf.)		
Genus XX. <i>CYPROGENIA</i> (Agassiz)		
48.— <i>C. Aberti</i> (Con.)		
(15) <i>C. Aberti lamarckiana</i> (Lea)		
Genus XXI. <i>OBOVARIA</i> (Raf.)		
Sub-Genus I. <i>PSEUDOON</i> (Simp.)		
49.— <i>O. (Pseudoon ellipsis</i> (Lea))	X	X
Genus XXII. <i>NEPHRONAIAS</i> (Cross and Fisher)		
50.— <i>N. ligamentina</i> (Lam.) (= <i>Lampsilis ligamentina</i> (Lam.))	+	+
(16) <i>N. ligamentina ribba</i> (Simp.)		

Genus XVIII.	<i>ELLIPSARTIA</i> (Raf.)			
46.—	<i>E. occidentalis</i> (Con.) (= <i>Ptychobranchus clintonense</i> (Simp.))			
Genus XIX.	<i>OBLIQUARIA</i> (Raf.)			
47.—	<i>O. reflexa</i> (Raf.)			
Genus XX.	<i>CYPROGENIA</i> (Agassiz)			
48.—	<i>C. Aberti</i> (Con.)			
(15)	<i>C. Aberti lamarckiana</i> (Lea)			
Genus XXI.	<i>OBOVARIA</i> (Raf.)			
Sub-Genus I.	<i>PSEUDOON</i> (Simp.)			
49.—	<i>O. (Pseudoon ellipsis</i> (Lea).....	X	X	
Genus XXII.	<i>NEPHRONAIAS</i> (Cross and Fisher)			
50.—	<i>N. ligamentina</i> (Lam.) (= <i>Lampsilis ligamentina</i> (Lam.))	+	+	+
(16)	<i>N. ligamentina gibba</i> (Simp.)			
51.—	<i>N. ellipsiformis</i> (Con.) (= <i>Lamp. ellipsiformis</i> (Con.)) ²			
(17)	<i>N. ellipsiformis venusta</i> (Lea) (= <i>Lamp. venusta</i> (Lea)) ²			
52.—	<i>N. Pleasii</i> (Marsh) (= <i>Lamp. pleasii</i> (Marsh)) ²			
53.—	<i>N. ozarkensis</i> (Call) (= <i>Lamp. ozarkensis</i> (Call))			
Genus XXIII.	<i>AMYGDALONAIAS</i> (Cross and Fisher)			
54.—	<i>A. donaciformis</i> (Lea) (= <i>Plagiola donaciformis</i> (Lea))	X	X	
55.—	<i>A. truncata</i> (Raf.) (= <i>Plagiola elegans</i> (Lea))	X		
Genus XXIV.	<i>PLAGIOLA</i> (Raf.)			
56.—	<i>P. lineolata</i> (Raf.) (= <i>Plagiola securis</i> (Lea))	+		
Genus XXV.	<i>LASMONOS</i> (Raf.)			
57.—	<i>L. fragilis</i> (Raf.) (= <i>Lamp. gracilis</i> (Barnes))	+	X	+
58.	<i>L. Simpsoni</i> (Ferriss) (= <i>Lamp. simpsoni</i> (Fer.))			
59.—	<i>L. leptodon</i> (Raf.) (= <i>Lamp. leptodon</i> (Raf.))	-		
Genus XXVI.	<i>PROPTERA</i> (Raf.)			
60.—	<i>P. alata</i> (Say) (= <i>Lamp. alata</i> (Say))	X	X	X
61.—	<i>P. purpurata</i> (Lam.) (= <i>Lamp. purpurata</i> (Lam.))			
62.—	<i>P. laevissima</i> (Lea) (= <i>Lamp. laevissima</i> (Lea))	X	X	+
63.—	<i>P. capax</i> (Green) (= <i>Lamp. capax</i> (Green))	+	X	
Genus XXVII.	<i>TOXOLASMA</i> (Raf.)			
64.—	<i>T. parva</i> (Barnes) (= <i>Lamp. parva</i> Bar.)	X		
65.—	<i>T. texensis</i> (Lea) (= <i>Lamp. texensis</i> (Lea))			
66.—	<i>T. lividum</i> (= <i>Lamp. glans</i> (Lea))			
Genus XXVIII.	<i>EURYNIA</i> (Raf.)			
Sub-Genus II.	<i>MICROMYA</i> (Agassiz)			
67.—	<i>E. (Micromya) lienosa</i> (Con.) (= <i>Lamp. lienosa</i> (Con.))			
68.—	<i>E. (Micromya) iris</i> (Lea) (= <i>Lamp. iris</i> (Lea))			
69.—	<i>E. (Micromya) brevicula</i> (Call.) (= <i>Lamp. brevicula</i> (Call.)) ²			
(18)	<i>E. Micromya brevicula Brittsii</i> (Simp.) (= <i>Lamp. brittii</i>) ³			
Sub-Genus III.	<i>EURYNIA</i> (sens. strict.)			
70.—	<i>E. (Eurynia) subrostrata</i> (Say) (= <i>Lamp. subrostrata</i>)			
71.—	<i>E. (Eurynia) recta</i> (Lam.) (= <i>Lamp. recta</i>)	+	X	
Genus XXIX	<i>LAMPSILIS</i> (Raf.)			
72.—	<i>L. teres</i> (Raf.) (= <i>Lamp. anodontoides</i> (Lea))	X	X	+
73.—	<i>L. fallaciosa</i> (Smith)			+
74.—	<i>L. Higginsii</i> (Lea)	-		
75.—	<i>P. Powellii</i> (Lea)			
76.—	<i>L. luteola</i> (Lam.)	-		
77.—	<i>L. luteola rosacea</i> (DeKay)			
78.—	<i>L. cardia</i> (Faf.) (= <i>Lamp. ventricosa</i> (Barnes))	+	X	
(20)	<i>L. cardia saturata</i> (Lea)			
Genus XXX.	<i>TRUNCILLA</i> (Raf.)			
79.—	<i>T. Curtissii Frierson and Utterback</i> (New Species)			
80.—	<i>T. Lefevrei Utterback</i> (New Species)			
100.=	Total of Species (80) and Sub-Species (20) for Missouri, including 1 New Genus, 4 New Species, 3 New Sub-Species.			

¹ Recent studies of the animal characters of *Utterbackii* has found this species to belong to the GENUS *LAMPSILIS*.

² Later studies would group these species under *Erynnia*, Sub-Genus *Micromya*.

³ Both of these *LAMPSILINAE* were subsequently found to belong to the GENUS *LAMPSILIS* near to *L. li*.

belong to the GENUS *FUSCONIA*.

MPSILIS near to *L. luteola* (Lam.).